a secretory DNA sequence encoding a signal sequence functional in bovine mammary secretory cells;

a recombinant DNA sequence encoding a recombinant polypeptide, the secretory DNA sequence being operably linked to the recombinant DNA sequence, wherein a secretory recombinant DNA sequence is formed, the secretory-recombinant DNA sequence being operably linked to the bovine α-s1 promoter and enhancer;

wherein the transgene, in a lactating form of the bovine or a female descendant of the bovine, is capable of directing the expression of the secretory-recombinant DNA sequence in bovine mammary secretory cells to produce a form of recombinant polypeptide, that when secreted from the mammary secretory cells produces the recombinant polypeptide in the milk of the bovine or female descendant thereof.

99. The transgenic bovine of claim 98, wherein the transgene further comprises:

an α-s1 casein 3' untranslated sequence.

100. The transgenic bovine of claim 99, wherein the transgene further comprises an α-s1 casein 3' flanking sequence.

101. The transgenic bovine of claim 100, wherein the α-s1 casein 3' flanking sequence has a length of at least 2 kb.

102. The transgenic bovine of claim 101, wherein the transgene further comprises at least 16 kb of α-s1 casein 5' flanking sequence.

103. The transgenic bovine of claim 102, wherein the transgene further comprises an intronic sequence.

104. The transgenic bovine of claim 103, wherein the intronic sequence is a hybrid intronic sequence.

105. The transgenic bovine of claim 104, wherein the hybrid intronic sequence comprises a 5' portion of a bovine α-S1 casein intronic sequence and a 3' portion of an IgG heavy chain intronic sequence.

106. The transgenic bovine of claim 105 wherein the 3' portion is a 3' splice signal sequence associated with the J-C segment rearrangement of an IgG heavy chain.

107. The transgenic bovine of claim 106, wherein the recombinant polypeptide is a homologous polypeptide from the bovine.

108. The transgenic bovine of claim 106, wherein the recombinant polypeptide is a heterologous polypeptide.

109. The transgenic bovine of claim 108, wherein the heterologous polypeptide is selected from the group consisting of human milk proteins, human serum proteins, and industrial enzymes.

110. The transgenic bovine of claim 109, wherein the heterologous polypeptide is a human milk protein.

111. The transgenic bovine of claim 110, wherein the human milk protein is selected from the group consisting of secretory immunoglobulins, lysozyme, lactoferrin, lactoglobulin, α-lactalbumin and bile salt-stimulated lipase.

112. The transgenic bovine of claim 111, wherein the milk protein is lactoferrin or lysozyme.

113. The transgenic bovine of claim 108, wherein the heterologous polypeptide is a human serum protein.

114. The transgenic bovine of claim 113, wherein the human serum protein is selected from the group consisting of albumin, immunoglobulin, Factor VIII, Factor IX and Protein C.

115. The transgenic bovine of claim 114, wherein the serum protein is albumin.

116. The transgenic bovine of claim 108, wherein the heterologous polypeptide is an industrial enzyme selected from the group consisting of proteases, lipases, chitinases and ligninases.

117. The transgenic bovine of claim 106, wherein the recombinant polypeptide is a naturally occurring polypeptide.

118. The transgenic bovine of claim 98, wherein the transgene is the 26 kb NotI fragment of plasmid p26,8h1F4.

119. The transgenic bovine of claim 98 that is capable of secreting the recombinant polypeptide into the milk at a concentration of greater than 50 μg/ml.

120. A method for producing a transgenic bovine said method comprising:

introducing the transgene of claim 1 into a bovine zygote;

transplanting the zygote or an embryo obtained therefrom into a recipient female bovine parent; and

identifying at least one offspring or a female descendant of said offspring which is capable of producing said recombinant polypeptide in the milk of said offspring or descendant.

121. The method of claim 120, wherein said transgenic bovine or female descendant thereof is capable of secreting said

recombinant polypeptide into said milk at a concentration of greater than 50 μg/ml.

122. A transgenic bovine embryo produced by the steps of:

obtaining an ovum from bovine ovaries;

fertilizing the ovum *in vitro* to form a zygote;

introducing a transgene into the zygote; and

propagating the zygote to form the embryo.

123. A method of producing a transgenic bovine the method comprising:

obtaining an ovum from bovine ovaries;

fertilizing the ovum *in vitro* to form a zygote;

introducing a transgene into the zygote;

propagating the zygote to form an embryo; and

transplanting the embryo into a recipient female bovine parent, which gestates the embryo to give birth to the transgenic bovine.

124. A transgenic bovine which is an offspring of the transgenic bovine produced according to claim 123 or offspring thereof.

125. A transgenic bovine produced by the method of claim 123 having a genome containing a transgene comprising:

a mammary-gland specific promoter;

a mammary-gland specific enhancer;

a secretory DNA sequence encoding a signal sequence functional in bovine mammary secretory cells;

a recombinant DNA sequence encoding a recombinant polypeptide, the secretory DNA sequence being operably linked to the recombinant DNA sequence, wherein a secretory recombinant DNA sequence is formed, the secretory-recombinant DNA sequence being operably linked to the promoter and enhancer;